Harbor Beach Community Schools
. . . Meeting Students' Needs

Several years ago, we noticed that our students were continually struggling in mathematics in the middle school (specifically, grades 7 and 8). A tutor we hired was concentrating solely on mathematics tutoring. In response to this, we changed our middle school classes so that our mathematics and language arts course times were expanded to cover a block-and-a-half. This change allows us to present new material and offer guided practice within the course. Students do not have any study halls, but expanding the class times gave the opportunity for students to receive help from the core math teacher. This has significantly reduced the number of students who needed extra help in mathematics and at the same time increased the number of students who are successful in mathematics.

This school year, we made the switch in our mathematics curriculum to align with the Grade-Level Content Expectations so that all our 7th grade students are taking Pre-Algebra and our 8th grade students are taking Algebra I. This switch means that students who succeed in Algebra I may begin their high school mathematics sequence by immediately taking Geometry. It also means that students who may struggle with Algebra I in eighth grade can re-take this course in their ninth grade year; taking the course twice will reinforce and develop their math skills to a higher degree.

To meet the challenge of the high school Merit Core, we will follow our middle school model which was designed after review of research of 90-90-90 schools. Thus, we will expand the high school course times so that the mathematics and language arts courses through the junior year meet for a block-and-a-half. These classes are offered opposite each other. Again, mathematics is the area in which we feel students will have the greatest struggle. To meet their needs, we will expand the class time from 52 minutes to 78 minutes. This will allow time for both direct instruction (40 minutes) and guided practice (38 minutes). Students will be able to ask questions directly of the math teacher.

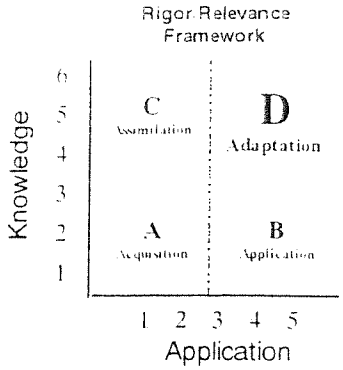
In addition, we plan to make the mathematics courses more relevant to all students. For every mathematics standard, teachers will identify a minimum of three real-life mathematical examples that cover three different career pathways. These examples will be integrated into the math lessons. Assessments will include the real-life problems. See attached "Own Your Own Business" example.

Also, by expanding the language arts class times, students will have 4 ½ credits of English language arts after their junior year. By doing this, we free students to take more electives their senior year.

One more thing we will ask our teachers to do is "think like an assessor." To do this, teachers will identify the desired results first. They will then decide what evidence they need to determine the extent to which students have achieved the desired results. This is the time when assessments are created. Lastly, teachers will create a learning plan which includes activities, instruction, and experiences that will lead students to achieve the desired results. By "thinking like an assessor," all our instruction focuses on exactly what our identified results are and then working backward to see what needs to be taught.

Gold Seal Lesson

OWN YOUR OWN BUSINESS



Subject

MATHEMATICS **Grades** 9-12

Instructional Focus

Problem Solving: Students apply the process of mathematical modeling to real-world problem situations.

Statistics: Students collect, analyze, and interpret data.

Communication: Students express math ideas in writing.

Entrepreneurship: Students identify components of owning a business.

SCANS: Students identify, organize, plan, and allocate resources.

Performance Task

Owning a business is an appealing opportunity that many students would like to try. This lesson allows students to use real-life math skills to address problems that entrepreneurs experience. The task can be described to the students as follows:

1. You are opening a retail or service oriented business related to your vocational program.
   - Name your business.
   - Determine what product(s) or service(s) you will market from the outset.
   - Determine start up costs. Some factors to consider could include the number of employees, salary and benefits offered to employees, rental space of a building, initial advertising, and initial stocking of merchandise.
2. Determine the normal operating costs for a single month. Consider ALL factors!
3. Assuming you are granted a 12 month loan at 9.75% interest on the start up costs, determine how much money you will need to earn per month to repay all debts and be able to produce a profit at the end of that year.
4. All data amounts MUST be organized in table format. You will probably need an organized table for each step indicated above on a spreadsheet. Importing a spreadsheet into a word processing document is a nice touch but is not mandatory. Both writing and mathematics are required elements for this task.

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Scoring Guide

4 POINTS: The student completes the task independently. He/she calculates the costs and profits. He/she considers all factors in owning a business. He/she uses technology to organize the information into a usable table.

3 POINTS: The student needs coaching to set goals. He/she considers most factors in owning a business. He/she calculates the payment and profits with minimal errors. He/she is fairly organized using technology.

2 POINTS: The student needs coaching throughout the entire task in order to complete required work. He/she considers some factors in owning a business. He/she demonstrates limited understanding of calculating loans and profits. The student's work is not well organized and contains one major error. He/she is not able to use technology appropriately.

1 POINT: The student is unable to complete task. The student considers only a few factors in owning a business. He/she demonstrates minimal understanding of calculating loans and profits. His/her work is sloppily done, is poorly organized and contains several errors. He/she does not use technology.

Essential Skills

- Perform operations with signed (positive and negative) numbers, including decimals, ratios, percents, and fractions. (m1)
- Understand the best procedures for statistical data collection, organization, and display. (m5)
- Understand the concepts recurrence relations and how they are applicable to such things as compound interest and annuity. (m61)
- Understand the nature and purpose of and be able to word process a variety of formats including essays, business letters, memos, instructions, policy statements, technical proposals, user manuals, lab reports, etc. (ela30)

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The Michigan Merit core of academic courses in the State Board's plan includes:

* four years of English language arts
* one year each of Algebra I, Geometry, Algebra II, and an additional math class or math-related class in the senior year
* one year each of Biology; Physics or Chemistry; plus one additional year of science
* three years of social science, which must include one semester each of civics and economics
* two years of world languages
* one year of health or physical Educationation
* one year of visual and performing arts

Requires all high school students take the Michigan Merit Exam or alternate MI-ACCESS

All students must complete at least one on-line credit or non-credit course or learning experience

* Year equals one credit (may double up and do two credits in one year; exception--math or math-related class must be taken senior year)

Student Educational Development Plans (EDP's)

Student pursues an advanced academic course of study; Student begins with Algebra I and doubles up by taking two math classes one year

A	9th	10th	11th	12th
1st Hour	Algebra I	Geometry	Functions, Statistics & Trigonometry	Calculus
2nd Hour	Composition I / Literature I	Composition II / Literature II	Expository & Technical Writing / Literature Elective	ELECTIVE: Advanced Placement English
3rd Hour				ELECTIVE: Advanced Placement U.S. History / Sociology
4th Hour	Biology I	Chemistry I	Physics	ELECTIVE: Advanced Placement Biology
5th Hour	Economics / Civics	United States History I & II	World History	ELECTIVE: Psychology / Advanced Placement Psychology
6th Hour	Physical Education / Health	Algebra II	Spanish I	Spanish II
7th Hour	Art I / Art II (Fine Arts Requirement)	ELECTIVE: Student Assistant	ELECTIVE: Publications	ELECTIVE: Computer Applications III / Computer Applications IV

Student pursues an advanced academic course of study.				
B	9th	10th	11th	12th
1st Hour	Geometry	Algebra II	Functions, Statistics & Trigonometry	Calculus
2nd Hour	Composition I / Literature I	Composition II / Literature II	Expository & Technical Writing / Literature Elective	ELECTIVE: Advanced Placement English
3rd Hour				ELECTIVE: Advanced Placement U.S. History / Sociology
4th Hour	Biology I	Chemistry I	Physics	ELECTIVE: Advanced Placement Biology
5th Hour	Economics / Civics	United States History I & II	World History	ELECTIVE: Psychology / Advanced Placement Psychology
6th Hour	Physical Education / Health	Spanish I	Spanish II	ELECTIVE: Bigger Stronger Faster
7th Hour	Art I / Art II (Fine Arts Requirement)	ELECTIVE: Publications	ELECTIVE: Chemistry II	ELECTIVE: Computer Applications III / Computer Applications IV

Student pursues a career in Agriculture and/or Industry (Career Pathway--Business, Management, Marketing and Technology OR Natural Resources and Agri-science)				
C	9th	10th	11th	12th
1st Hour	Algebra I	Geometry	Algebra II	Accounting I (Math-related course)
2nd Hour	Composition I / Literature I	Composition II / Literature II	Expository & Technical Writing / Literature Elective	ELECTIVE: Architectural Drafting
3rd Hour				World History
4th Hour	Botany / Zoology	Physical Science	Introduction to Veterinary Science	ELECTIVE: Agriculture Communications
5th Hour	Economics / Civics	United States History I & II	ELECTIVE: Woods I	ELECTIVE: Woods II
6th Hour	Physical Education / Health	ELECTIVE: Computer Applications II / Computer Applications III	Spanish I	Spanish II
7th Hour	Art I / Art II (Fine Arts Requirement)	ELECTIVE: Introduction to Industry and Technology	ELECTIVE: Mechanical Drafting I	ELECTIVE: Mechanical Drafting II

Student goes to the Technical Center both 11th and 12th grades; senior year math class is taken at the local district

D	9th	10th	11th	12th
1st Hour	Algebra I	Geometry	Algebra II	Math Requirement
2nd Hour	Composition I / Literature I	Composition II / Literature II	Expository & Technical Writing / Literature Elective	World History
3rd Hour				Science Requirement
4th Hour	Biology	Chemistry	Travel	Travel
5th Hour	Economics / Civics	United States History I & II	Technical Center	Technical Center
6th Hour	Physical Education / Health	Art I / Art II (Fine Arts Requirement)		
7th Hour	Spanish I	Spanish II		

Student goes to the Technical Center both 11th and 12th grades; Student starts math sequence with Geometry due to passing Algebra I in the 8th grade; senior year math class is taken at the Technical Center

E	9th	10th	11th	12th
1st Hour	Geometry	Algebra II	Functions, Statistics & Trigonometry	Science Requirement
2nd Hour	Composition I / Literature I	Composition II / Literature II	Expository & Technical Writing / Literature Elective	World History
3rd Hour				Elective
4th Hour	Biology	Chemistry	Travel	Travel
5th Hour	Economics / Civics	United States History I & II	Technical Center	Technical Center (includes math class)
6th Hour	Physical Education / Health	Art I / Art II (Fine Arts Requirement)		
7th Hour	Spanish I	Spanish II		

Student goes to the Technical Center 12th grade only				
F	9th	10th	11th	12th
1st Hour	Algebra I	Geometry	Algebra II	Technical Center (includes mathematics class--we recommend all Technical Center students take Accounting)
2nd Hour	Composition I / Literature I	Composition II / Literature II	Expository & Technical Writing / Literature Elective	
3rd Hour				
4th Hour	Botany / Zoology	Physical Science	Introduction to Veterinary Science	
5th Hour	Economics / Civics	United States History I & II	World History	
6th Hour	Physical Education / Health	Spanish I	Spanish II	
7th Hour	Band (Fine Arts Requirement)	ELECTIVE: Band	ELECTIVE: Band	ELECTIVE: Band

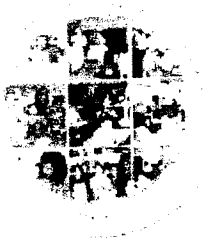
Student begins with Algebra I, takes all required courses and has almost all Electives the senior year				
G	9th	10th	11th	12th
1st Hour	Algebra I	Geometry	Algebra II	Accounting I
2nd Hour	Composition I / Literature I	Composition II / Literature II	Expository & Technical Writing / Literature Elective	Elective
3rd Hour				Elective
4th Hour	Biology	Chemistry	Physics	Elective
5th Hour	Economics / Civics	United States History I & II	World History	Elective
6th Hour	Physical Education / Health	Spanish I	Spanish II	Elective
7th Hour	Art I / Art II (Fine Arts Requirement)	Elective	Elective	Elective

Student passes Algebra I in 8th grade, begins with Geometry, has an added Elective the Junior year, and almost all Electives the senior year				
H	9th	10th	11th	12th
1st Hour	Geometry	Algebra II	Elective	Accounting I
2nd Hour	Composition I / Literature I	Composition II / Literature II	Expository & Technical Writing / Literature Elective	Elective
3rd Hour				Elective
4th Hour	Biology	Chemistry	Physics	Elective
5th Hour	Economics / Civics	United States History I & II	World History	Elective
6th Hour	Physical Education / Health	Spanish I	Spanish II	Elective
7th Hour	Band (Fine Arts Requirement)	Elective	Elective	Elective

Our true task for the future are the relationships we can build between technical centers and community colleges, creating articulation agreements for students exiting technical centers. To this end, students would have the opportunity to attend Technical Centers and earn college credits at the same time.

Additionally, by creating partnerships with colleges, students pursuing an advanced academic schedule would have the opportunity to earn college credits the senior year. See following page on EARLY COLLEGE information from North Carolina.

"EARLY COLLEGE"



Robeson Community College will be the site this school year of the first Early College Program implemented by the Public Schools of Robeson County. The program is intended for high school students who may not be considering pursuing higher education or even completing high school.

Students would be enrolled for five years after which they would receive their high school diploma and attain their Associate Degree or two years of credits towards a four year degree while in high school. Since they will be registered as high school students, there will be significant financial savings to the student and the parent insofar as higher education costs are concerned. Among the positives relating to Early College is the potential of encouraging the students to continue their education at a two or four year college. Additionally, it is hoped that the program would have the effect of significantly reducing the system's dropout rate.

In the first year, there will be students entering for grades 9, 10 and 11 in order to get the program started. After the first year, entrance will only be at the grade 9 level. Interest in the program is such that the 120 positions available at RCC have already been filled with a waiting list for openings as they occur.

Funding for Early College has been provided by the State for 14 counties who are part of the pilot program.

Resources we have identified to help us create this library of real-world problems include:

Wexford-Missaukee Intermediate School District Pacing Guides

INFORMS Mathematics of Decision Making in Industry and Government, www.hsor.org
Kenneth Chelst, Dept. of Industrial & Manufacturing Engineering
kchelst@wayne.edu
Tom Edwards, College of Education
t.g.edwards@wayne.edu

SVSU Math/Science Center MASER Mathematics materials
Walter Rathkamp, Director, SVSU Regional Math/Science Center
Teacher-evaluated web sites that support each of the benchmarks in mathematics with classroom lessons, some of them with real-life applications

Gold Seal Lessons from the International Center for Leadership in Education

CORD series—mathematics problems relating to real life